

WHAT IS CLAIMED IS:

1. A laminar structure used for constructing walls, floors, or ceilings or doors comprising:

two external layers of a material,

at least one internal constraining layer, and two or more internal layers of a viscoelastic separated by said at least one internal restraining layer.

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2. Structure as in claim 1, wherein the constraining layer comprises metal.

3. Structure as in Claim 1, wherein said two external
15 layers comprise each a selected thickness gypsum board layer.

4. Structure as in Claim 3, wherein said glue comprises a viscoelastic material capable of absorbing sound.

20 5. Structure as in Claim 4, wherein said internal metal layer comprises a sheet metal layer of selected thickness.

6. Structure as in Claim 5, wherein said sheet metal layer of selected thickness comprises galvanized steel.

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7 A laminar structure comprising:

at least one internal layer of a selected material;

two internal layers of a viscoelastic glue, one such layer on each side of said internal layer; and

30 at least one additional layer on the other side of
each internal layer of viscoelastic glue.

8. Structure as in claim 7 wherein said at least one additional layer comprises an external layer of a first sound absorbing material.

9. Structure as in claim 8 wherein said external layer of a first sound absorbing material comprises gypsum.

5 10. Structure as in claim 8 wherein said at least one external layer comprises a plurality of layers of selected materials.

10 11. Structure as in claim 10 wherein said plurality of layers of selected materials comprise:

a first layer of metal;
a second layer of viscoelastic glue; and
a third layer of selected material.

15 12. Structure as in claim 11 wherein said third layer of selected material comprises gypsum.

13. Structure as in claim 7 wherein said at least one internal layer comprises a metal layer.

20 14. Structures in claim 7 wherein said at least one internal layer comprises a layer of a cellulose material such as wood.

25 15. Structures in claim 7 wherein said at least one internal layer comprises a layer of a solid petroleum-based synthetic material such as a vinyl, plastic composite, or rubber.

30 16. The method of forming a laminar structure which comprises:

providing a layer of first material having two surfaces;
placing a layer of viscoelastic glue onto one surface of said layer of first material;

35 placing a layer of a second material over said

viscoelastic glue;

pressing said layer of second material against said layer of viscoelastic glue and said layer of first material for a selected time; and

5 drying said layer of second material, said layer of first material and said viscoelastic glue.

17. The method of claim 16, including:

providing an internal layer of material or multiple
10 layers of selected materials;

forming a layer of viscoelastic glue on each of what are to be internal surfaces of two or more laminar structures formed using the steps of claim 16;

15 placing two or more such laminar structures with the two or more to-be internal surfaces adjacent said internal layer or said multiple layers;

pressing the composite structure formed in the preceding step at a selected pressure for a selected time; and
drying the composite structure being pressed.

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18. The method of claim 16 wherein said first material comprises a metal layer, and said second material comprises a gypsum layer.

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19. The method of claim 17 wherein said internal layer comprises a cellulose-based layer such as any wood.

20. The method of claim 17 wherein said cellulose layer is wood.

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21. The method of claim 17 wherein said internal layer comprises a layer selected from the group consisting of vinyl, plastic composite, and rubber.

22. The method of claim 18 wherein said internal layer comprises a metal layer selected from the group consisting of galvanized steel, stainless steel, aluminum, titanium, and a composite of two or more metals.

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23. The method of claim 22 wherein said metal layer comprises galvanized steel.

10 24. Structure as in claim 1 wherein the internal constraining layer is a cellulose product, such as wood.

25. Structure as in claim 24 wherein said cellulose product is wood.

15 26. Structure as in claim 1 wherein said at least one internal constraining layer is selected from the group consisting of cellulose, wood, metal, plastic, vinyl, plastic composite and rubber.

20 27. The method of forming a laminar structure which comprises:

providing a layer of first material having two surfaces;

placing a layer of viscoelastic glue onto one surface of said layer of first material;

25 placing a layer of a second material, which is 1/100th to 1/2 the thickness of the first material over said viscoelastic glue;

30 pressing said layer of second material against said layer of viscoelastic glue and said first material for a selected time; and

drying said layer of second material, said layer of first material and said viscoelastic glue.

28. The method of claim 27 wherein said first material comprises a gypsum layer, and said second material comprises a metal layer.

29. The method of claim 27 wherein said first material comprises a gypsum layer, and said second material comprises a layer selected from the group consisting of plastic and a plastic composite layer.

30. The method of claim 27 wherein said first material comprises a gypsum layer, and said second material comprises a layer selected from the group consisting of vinyl and rubber.

31. The method of claim 27 wherein said first material comprises a gypsum layer, and said second material comprises a layer selected from the group consisting of cellulose-based material and wood.

32. The method of claim 27 wherein said first material comprises a layer selected from the group consisting of a cellulose-based material and wood, and said second material comprises a metal.

33. The method of claim 27 wherein said first material comprises a material selected from the group consisting of a cellulose-based material and a wood layer, and said second material comprises a material selected from the group of materials consisting of a petroleum-based plastic composite and a petroleum-based rubber layer.

34. The method of claim 27 wherein said first material comprises a layer selected from the group consisting of a cellulose-based material and wood, and said second material comprises a layer selected from the group consisting of a petroleum-based plastic composite, vinyl and rubber.

35. The method of forming a laminar structure which comprises:

providing a layer of first material having two surfaces;

5 placing a layer of viscoelastic glue onto one surface of said layer of first material;

placing a layer of a second material over said viscoelastic glue;

10 pressing said layer of second material against said layer of viscoelastic glue and said first material for a selected time; and

drying said layer of second material, said layer of first material and said viscoelastic glue.

15 36. The method of claim 35 wherein the two exterior layers are symmetric, made of the exact same type of material, and having the exact same density and thickness.

37. The method of claim 35 wherein the two exterior layers are non-symmetric, made of other than the exact same type of material, and having other than the exact same density and thickness.

38. The method of claim 35 wherein the two or more interior layers are symmetric, made of the same type of material, and having the same density and thickness.

25 39. The method of claim 35 wherein the two or more interior layers are non-symmetric, made of other than the exact same type of material, and having other than the same density and thickness.

30 40. A laminar, sound-absorbing structure which comprises:

a layer of first material having two surfaces;

a layer of viscoelastic glue on one surface of said layer of first material; and

a layer of a second material over said viscoelastic

35 glue.

41. A laminar, sound-absorbing structure as in claim 40
wherein said layer of second materials is $1/10^{\text{th}}$ to $\frac{1}{2}$ the
thickness of the first material.

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